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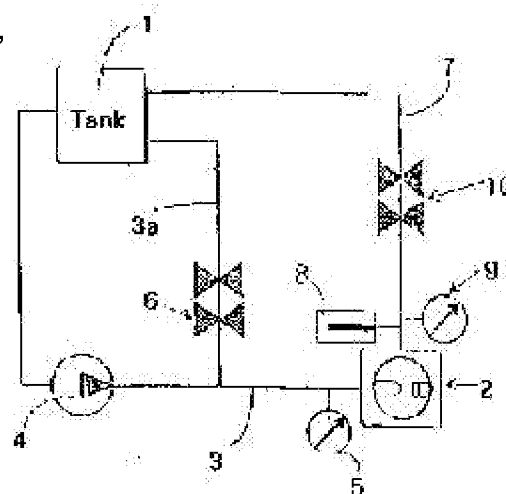
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(54) METHOD FOR INHIBITTING CORROSION ON METAL WORKPIECE SURFACE BY CAVITATION AND FOR REDUCING CAVITATION CORROSION, AND PRODUCT TREATED TO IMPROVE CORROSION RESISTANCE AND PREVENTION PROPERTY FOR CAVITATION CORROSION

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method for preventing a corrosion or reducing a cavitation corrosion, for a workpiece such as a machine part or a fluidic device, composed of materials selected from the group consisting of a carbon steel, a low-alloy steel of ferrite base, a ferrous casting, a stainless steel, aluminum, and an aluminum alloy, and to provide a product which is treated to improve a corrosion resistance and/or a prevention property for the cavitation corrosion.

SOLUTION: The method for preventing the corrosion or reducing the cavitation corrosion for the workpiece comprises, controlling pH of a liquid to be alkaline, when a cavitation air bubble which is generated by a water jet in the liquid or an ultrasonic wave in the liquid, is collided with a workpiece and collapsed, and also forming a passivated layer on the workpiece through a rise in an electric potential due to the collapse.



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CLAIMS

[Claim(s)]

[Claim 1]While carrying out pH adjustment of the fluid concerned so that it may become alkalinity when generate cavitation air bubbles using a ***** jet or an ultrasonic wave in liquid, making the workpiece surface **** this and making cavitation air bubbles collapse, An anticorrosion approach of a workpiece and/or a reducing method of cavitation erosion which are characterized by raising potential on the surface of a workpiece by the collapse, and making it make the workpiece surface concerned generate a passivity layer.

[Claim 2]By generating cavitation air bubbles using a jet or an ultrasonic wave in an alkaline fluid, making the workpiece surface **** this, making cavitation air bubbles collapse, and raising potential on the surface of a workpiece by the collapse, An anticorrosion approach of a workpiece and/or a reducing method of cavitation erosion which are characterized by making it make the workpiece surface concerned generate a passivity layer.

[Claim 3]A cavitation processing container which filled an alkaline fluid on a workpiece is arranged, Blow off an application-of-pressure fluid for flowing a fluid in said container, pressurizing inside, and generating a cavitation, while it was this pressurized, and crash impulse force of cavitation air bubbles is increased, An anticorrosion approach of a workpiece and/or a reducing method of cavitation erosion which are characterized by raising potential on the surface of a workpiece according to the impulse force concerned, and making it make the workpiece surface concerned generate a passivity layer.

[Claim 4]It has the structure of generating cavitation air bubbles with a ***** jet or an ultrasonic wave in liquid, And when it is fluid equipment which has the structure which these cavitation air bubbles by which it was generated **** and collapse, An anticorrosion approach of fluid equipment and/or a reducing method of cavitation erosion having added an alkaline agent into the fluid concerned, using an alkaline solution as the fluid concerned, and using alkalinity and a made thing.

[Claim 5]An anticorrosion approach of a workpiece and/or a reducing method of cavitation corrosion corrosion which are characterized by including cavitation erosion-corrosion and/or cavitation corrosion with cavitation erosion in claim 1, claim 2, claim 3, or claim 4.

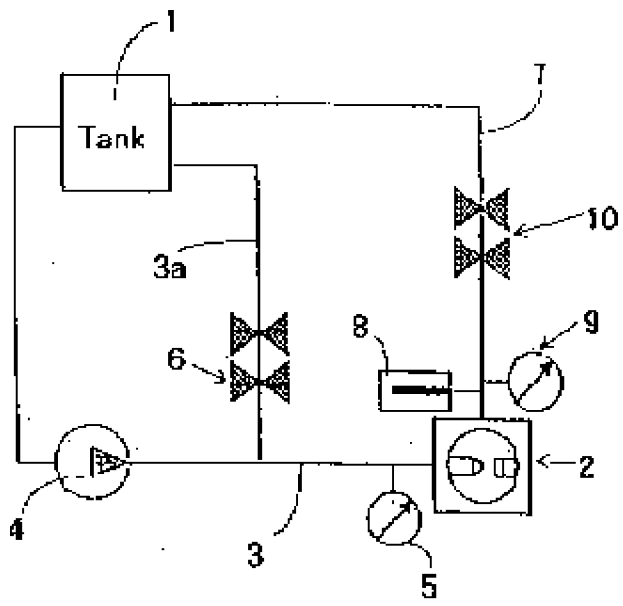
[Claim 6]In claim 1, claim 2, claim 3, or claim 4, An anticorrosion approach of a workpiece and/or a reducing method of cavitation erosion, wherein said workpiece comprises material chosen from a group of carbon steel, low alloy steel of a ferrite series, an iron system casting, stainless steel, aluminum, and an aluminum alloy.

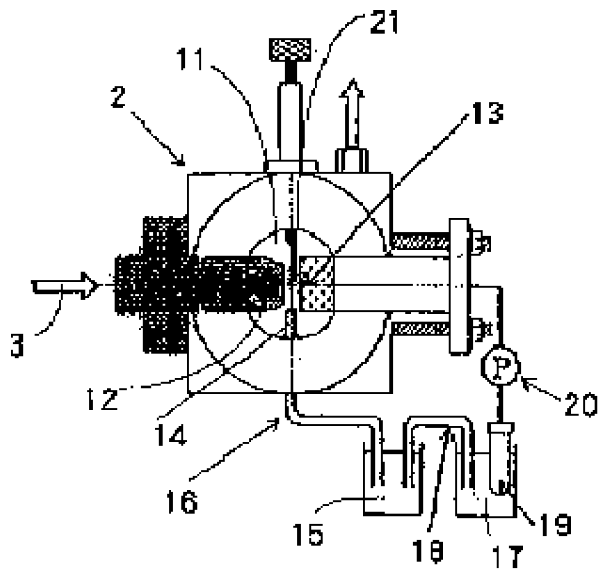
[Claim 7]While carrying out pH adjustment of the fluid concerned so that it may become alkalinity when generate cavitation air bubbles using a ***** jet or an ultrasonic wave in liquid, making the workpiece surface **** this and making cavitation air bubbles collapse, A work which carried out processing treatment which raises corrosion resistance and/or cavitation erosion tightness which are characterized by raising potential on the surface of a workpiece by the collapse, and making it make the workpiece surface concerned generate a passivity layer.

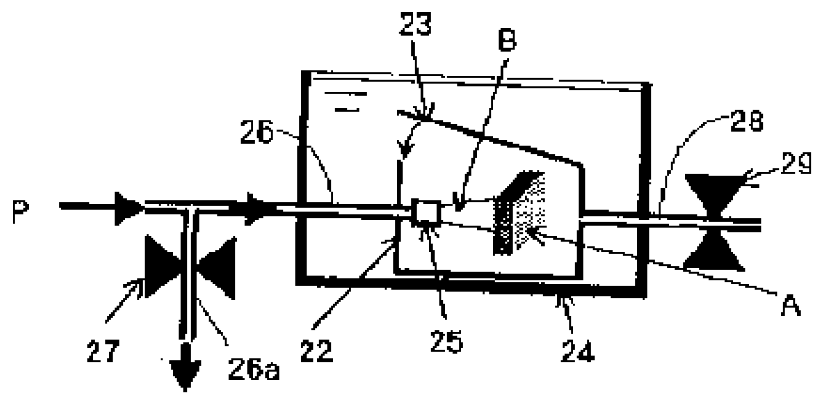
[Claim 8]Cavitation air bubbles are generated using a jet or an ultrasonic wave in a fluid, Make this **** on the workpiece surface and cavitation air bubbles are made to collapse, By peening effects of the collapse impulse force, work hardening on the surface of a workpiece, compression remains *****, When surface treatment, such as improvement in fatigue strength, is carried out or impulse force by the collapse washes a workpiece, while adjusting the fluid concerned to alkalinity, A work which carried out processing treatment which raised corrosion resistance and/or cavitation erosion tightness having raised potential on the surface of a workpiece and making the workpiece surface concerned generate a passivity layer.

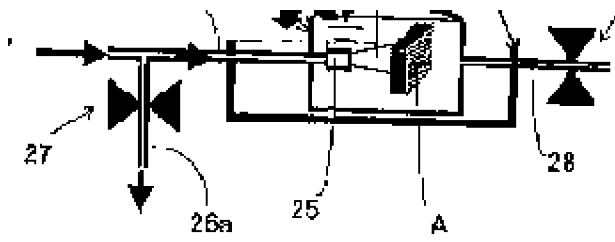
[Claim 9]Said workpiece in claim 7 or claim 8 Carbon steel, low alloy steel of a ferrite series, A work which carried out processing treatment which raised corrosion resistance and/or cavitation erosion tightness containing processed products which comprise material chosen from a group of an iron system casting, stainless steel, aluminum, and an aluminum alloy, and a machine part.

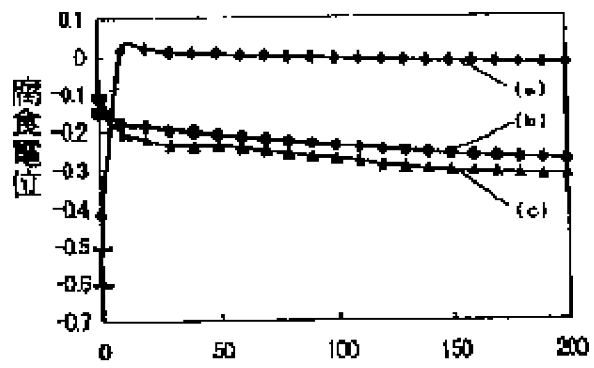
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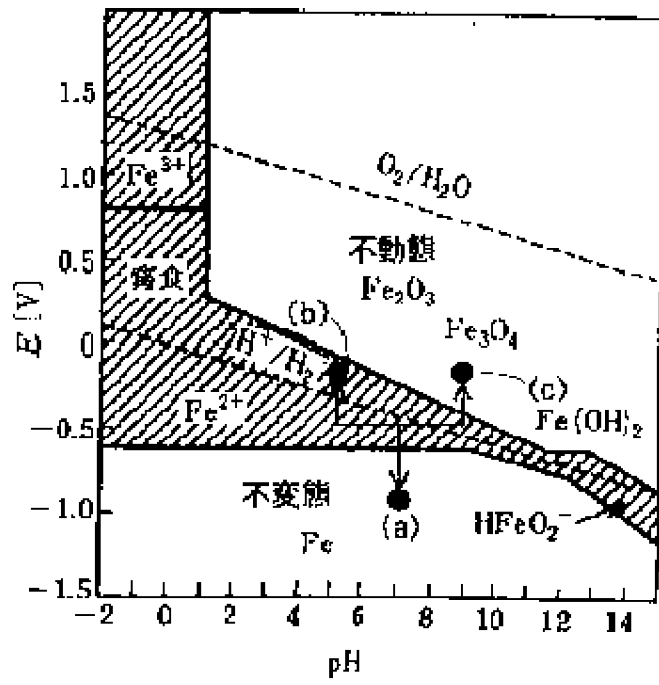












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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention Carbon steel, low alloy steel of a ferrite series, an iron system casting, stainless steel, An anticorrosion approach over workpieces which comprise material chosen from the group of aluminum and an aluminum alloy, such as a machine part and fluid equipment, or a reducing method of cavitation erosion, And it is related with the work which carried out processing treatment which raises corrosion resistance and/or cavitation erosion tightness.

[0002]

[Description of the Prior Art]Before, surface treatment using the peening effects by the high-speed underwater water jet accompanied by a cavitation, such as a remaining stress improvement of a metallic member, a fatigue strength improvement, work hardening, is performed (JP,59-193215,A, JP,4-240073,A). However, in addition, such surface treatment is based on a mechanical work called the collapse impulse force of air bubbles to the last. Since introduction of compressive residual stress was effective also for stress corrosion cracking, expression of reducing corrosion might be used. However, by a mechanical work called the collapse impulse force of air bubbles, this controls the corrosion which is a chemical operation to the last.

[0003]However, it was found out in recent years also about the anticorrosion approach by the cavitation which performs anticorrosion processing by making the liquid jet accompanied by a cavitation collide [be / it / under / liquid / setting] with a work (JP,7-328859,A). According to this "at the time of rapid collapse of cavitation air bubbles, underwater dissolved oxygen is contained in air bubbles, and is conveyed on the surface of material. This transportation is repeated only the number of times of collapse of air bubbles, iron (Fe) carries out a catalytic operation, and a stable stable passive state film is formed. Thus, the surface of material

becomes electrochemical very stable and advance of corrosion stops. In order to form such a passive state film stably, a jet or the optimal phenomenon also for the state of a cavitation exists. For example, if the collapse power to material is too strong when using an underwater water jet, erosion-corrosion (erosion) will be caused, the minute fragment which seceded from material will rub a material-list side strongly, and a passive state film will exfoliate. It is indicated as ". The statement of this publication before examination is not clarified about whether it should carry out why it happens to form such a passive state film stably how, although it has suggested that a passive state film may be formed by rapid collapse of cavitation air bubbles. And since corrosion may promote conversely if a cavitation jet is injected, the statement of this specification is not exact. However, meaning is at the point which found out that rapid collapse of cavitation air bubbles might form a passive state film. In that statement, the rule factor of the phenomenon which forms a passive state film cannot be grasped, repetitive continuation cannot be carried out as art, and reappearance practical use of this phenomenon cannot be carried out.

[0004]

[Problem(s) to be Solved by the Invention]The time of advancing research about the phenomenon of the surface treatment by the crash impulse force and the cavitation jet of cavitation air bubbles which carried out this invention person claudicaton, Although there are cavitation corrosion (corrosion) and cavitation erosion-corrosion (erosion) in that it should take into consideration simultaneously also about not the problem of only a physical action but chemical operations, such as crash impulse force, and the corrosion by a cavitation, a cavitation, Since both were different damage forms, they have noticed that it should carry out clear distinction.

[0005]This invention persons found out that it not only generates [the high impact pressure which is a physical action, and] the elevated-temperature spot which also amounts to thousands of times, but potential had arisen in the surface of rupture of cavitation air bubbles as an electrochemical action at the time of collapse of cavitation air bubbles as a result of research. It aims at the actual proof and mechanism break through of the corrosion-resistant improvement in the machinery material by a cavitation jet by this discovery, The corrosion rate was able to be measured with the electrochemical technique, the hydrogen concentration in the air bubbles which remain after the cavitation air-bubbles collapse by gas chromatography was able to be analyzed, and the rule factor of corrosion resistance or a passive state formation phenomenon was able to be clarified as follows based on this.

[0006]The corrosion potential of carbon steel is shifted to ** by a cavitation jet. An anode polarization curve moves to the low current density side by a cavitation jet. That is, if carbon steel is exposed to a cavitation jet, a corrosion rate will become small and the corrosion resistance of carbon steel will improve. From the influence of the dissolved oxygen

concentration in the cavitation jet exerted on corrosion-resistant improvement, it can be told to corrosion-resistant improvement that the oxidation passivity layer is involved. A cavitation jet collision surface is special environment which produces the potential of ** which hydrogen generates. It became clear that the corrosion-resistant improvement by a cavitation jet is influenced by water quality, such as pH of drinking water. Therefore, when making the surface improvement of material by a cavitation jet, even if it does not use ion exchange water, it can be said by dissolving a cheap and harmless weak alkaline salt that corrosion can be controlled.

[0007]"In the cavitation erosion-corrosion (erosion) accompanied by corrosion (corrosion) this invention persons about the control factor for reproducing certainly the corrosion-resistant improvement in the machinery material by a cavitation jet out of these results of research, If a solution is acidity, the corrosion by a cavitation will advance remarkably. It not only can control corrosion, but by adding alkali, it can passivate the portion which receives the attack of a cavitation. This invention was completed paying attention to the knowledge, ".

[0008]

[Means for Solving the Problem]The 1st invention that is going to obtain a patent generates capitation air bubbles using a ***** jet or an ultrasonic wave in liquid, While carrying out pH adjustment of the fluid concerned so that it may become alkalinity when making this **** on the workpiece surface and making cavitation air bubbles collapse, It is an anticorrosion approach of a workpiece and/or a reducing method of cavitation erosion which are characterized by raising potential on the surface of a workpiece by the collapse, and making it make the workpiece surface concerned generate a passivity layer.

[0009]When a fluid is pure water, potential shifts to ** and it shifts to ** in acidity and alkalinity. Potential is that ** becomes the potential's plus side like the precious metals, and potential is that ** is on a minus side. if it becomes **, generally it will be easy to become ion -- rust -- a cheap thing is meant. Thus, since corrosion-resistant improvement in a material-list side by cavitation injection is underwater performed using a chemical operation of a cavitation, it is greatly influenced by water quality. In common water, when potential shifted to **, iron was corroded by a pull bay diagram (Pourbaix diagram), but when adding alkali, it turned out that it becomes a passive state. Therefore, corrosion (corrosion) by a cavitation can be controlled by adjusting a solution to alkalinity. Namely, in cavitation erosion-corrosion accompanied by corrosion (corrosion), if a solution is acidity, corrosion (corrosion) by a cavitation will advance remarkably, but. It not only can control corrosion, but by adjusting to alkalinity, it can passivate a portion which receives an attack of a cavitation.

[0010]The 2nd invention that is going to obtain a patent generates cavitation air bubbles using a jet or an ultrasonic wave in an alkaline fluid, By making this **** on the workpiece surface, making cavitation air bubbles collapse, and raising potential on the surface of a workpiece by

the collapse, It is an anticorrosion approach of a workpiece and/or a reducing method of cavitation erosion which are characterized by making it make the workpiece surface concerned generate a passivity layer.

[0011]The 3rd invention that is going to obtain a patent arranges a cavitation processing container which filled an alkaline fluid on a workpiece, Blow off an application-of-pressure fluid for flowing a fluid into said inside, pressurizing inside, and generating a cavitation, while it was this pressurized, and crash impulse force of cavitation air bubbles is increased, It is an anticorrosion approach of a workpiece and/or a reducing method of cavitation erosion which are characterized by raising potential on the surface of a workpiece according to the impulse force concerned, and making it make the workpiece surface concerned generate a passivity layer.

[0012]The 4th invention that is going to obtain a patent has the structure of generating cavitation air bubbles with a ***** jet or an ultrasonic wave in liquid, And when it is fluid equipment which has the structure which these cavitation air bubbles by which it was generated **** and collapse, It is an anticorrosion approach of fluid equipment and/or a reducing method of cavitation erosion having added an alkaline agent into the fluid concerned, using an alkaline solution as the fluid concerned, and using alkalinity and a made thing.

[0013]In the 1st invention, the 2nd invention, the 3rd invention, or the 4th invention, the 5th invention that is going to obtain a patent with cavitation erosion. It is an anticorrosion approach of a workpiece and/or a reducing method of cavitation corrosion including cavitation erosion-corrosion and/or cavitation corrosion.

[0014]In the 1st invention, the 2nd invention, the 3rd invention, or the 4th invention the 6th invention that is going to obtain a patent, Said workpiece is an anticorrosion approach of a workpiece and/or a reducing method of cavitation erosion comprising material chosen from a group of carbon steel, low alloy steel of a ferrite series, an iron system casting, stainless steel, aluminum, and an aluminum alloy.

[0015]The 7th invention that is going to obtain a patent generates cavitation air bubbles using a ***** jet or an ultrasonic wave in liquid, While carrying out pH adjustment of the fluid concerned so that it may become alkalinity when making this **** on the workpiece surface and making cavitation air bubbles collapse, It is the work which carried out processing treatment which raises corrosion resistance and/or cavitation erosion tightness which are characterized by raising potential on the surface of a workpiece by the collapse, and making it make the workpiece surface concerned generate a passivity layer.

[0016]The 8th invention that is going to obtain a patent generates cavitation air bubbles using a jet or an ultrasonic wave in a fluid, Make this **** on the workpiece surface and cavitation air bubbles are made to collapse, By peening effects of the collapse impulse force, work hardening on the surface of a workpiece, compression remains *****, When surface treatment,

such as improvement in fatigue strength, is carried out or impulse force by the collapse washes a workpiece, while adjusting the fluid concerned to alkalinity, It is the work which carried out processing treatment which raised corrosion resistance and/or cavitation erosion tightness having raised potential on the surface of a workpiece and making the workpiece surface concerned generate a passivity layer.

[0017]In the 7th invention or the 8th invention the 9th invention that is going to obtain a patent, Said workpiece Carbon steel, low alloy steel of a ferrite series, an iron system casting, stainless steel, It is the work which carried out processing treatment which raised corrosion resistance and/or cavitation erosion tightness containing processed products which comprise material chosen from a group of aluminum and an aluminum alloy, and a machine part.

[0018]

[Example]In order to carry out this invention and to make the workpiece surface generate a passivity layer hereafter, a device is explained based on a graphic display. Drawing 1 is a composition explanatory view showing the cavitation jet device of an ASTM standard for proving that the principle and effect of this invention are a thing with workability. Drawing 2 is a composition explanatory view showing the structure of the cavitation jet operation examination section shown in the cavitation jet device concerned. Drawing 3 is a composition explanatory view showing the example of the pressure type cavitation jet device for carrying out this invention.

Drawing 4 is a composition explanatory view showing the other examples of the pressure type cavitation jet device for carrying out this invention.

Drawing 5 is a graph which shows the measurement result of the corrosion potential after the time of the collision of the cavitation jet in specimen water, or a collision.

Drawing 6 shows the pull bay diagram at the time of experimenting using the cavitation jet device shown in drawing 1 (Pourbaix diagram).

[0019]The cavitation jet device shown in drawing 1 connects from the tank 1 which stored the fluid to spout to the cavitation jet operation examination section 2 in the fluid supply route 3 and the by bus supply route 3a, The plunger pump 4 and inflow pressure 5 [a total of] which pressurize and send out a fluid in the middle of are provided, [the former fluid supply route 3] Even the tank 1 which forms the inflow regulating valve 6 in the middle of the latter by bus supply route 3a, and stored the fluid from the cavitation jet operation examination section 2 is connected in the fluid exhaust passage 7, and the thermometer 8, the flow pressure force gauge 9, and the flow regulating valve 10 are allocated in the middle.

[0020]The cavitation jet operation examination section 2 shown in drawing 2 is the nozzle 12 which connects with the fluid supply route 3 into the test chamber 11 with the space where a cavitation jet can collide, and generates a cavitation jet, and makes the flowing high pressure

water blow off from the tip of the nozzle 12.

13 in a figure is the sensor for corrosion potential measurement formed in the field where a cavitation jet collides.

The sensor 13 for corrosion potential measurement concerned embeds a specimen and a test specimen, and the field exposed to the jet of the specimen concerned and a sensor is attached at right angles to a jet axis. The carbon steel S45C was used for the test specimen. The cylindrical nozzle of throat part 0.4 mm in diameter, and [throat part / 1.2 mm] in length an ASTM standard was used for the aforementioned nozzle 12. 14 is the solution collection pipe made from stainless steel fixed near the collision surface of the cavitation jet in the test chamber 11.

It extends even in the solution storage container 15 which provided this outside, and the solution collected in the solution storage container 15 concerned by making this into the course 16 is stored.

The salinity depot 17 is placed next to it, and between the solution storage containers 15 is connected in the salt bridge 18. Corrosion potential was measured with the potential measurement machine 20 which allocates the silver silver chloride electrode 19 in the salinity depot 17 concerned, and was arranged between said sensors 13 by making this into a reference electrode. 21 is the jet shutter provided all over the test chamber 11.

[0021]Using ion exchange water, specimen water was made to dissolve 0.9g of calcium carbonate in this, and the water which blew carbon dioxide by 0.02MPa for 25 minutes, and was made into the acescence, and the water which was made to dissolve 60g of sodium bicarbonate, and was made into alkalescence were used for it. The test condition prepared three kinds of specimen water of water ** in which sodium bicarbonate is dissolved in the water in which (a) ion exchange water is dissolved, and calcium carbonate and carbon dioxide are dissolved in (b) ion exchange water in order to clarify and influence (c) ion exchange water of the water quality by pH and the dissolved ion of specimen water. The cavitation jet was injected on condition of the cavitation factor $\alpha = 0.014$ which is moreover a governing parameter of a cavitation jet, $s = 18$ mm, and injection time $t_{\text{jet}} = 5$ min, and the corrosion potential under injection and after injection was measured.

[0022]The corrosion potential in each specimen water of the test specimen carbon steel S45C was measured for 200 seconds after the jet stop as a corrosion-resistant valuation method by the cavitation jet operation examination section 2 shown in [drawing 1](#). The corrosion potential EV was displayed by SHE (standard hydrogen electrode). In order to evaluate the corrosion resistance of the test specimen in the field which receives an attack by a cavitation jet in the sensor 13, the cylindrical carbon steel S45C 6 mm in diameter was embedded on the Teflon (registered trademark) which is an insulator.

[0023][Drawing 5](#) combines with corrosion potential while injecting the corrosion potential after

injecting the cavitation jet in each specimen water, and shows the result of the above-mentioned example. (a) ***** was shown most and, subsequently to the order of (b) and (c), ***** was shown. Since (b) and (c) have many kinds of ion compared with (a), it is thought that it is based on the influence of dissolved ion.

[0024]The corrosion potential pH of specimen water, just before jet injection, and under jet injection is shown in Table 1. The corrosion potential under injection becomes ***** from the last corrosion potential only (a). That is, only in the case of ion exchange water, it is thought that a unique change has taken place.

[0025]

[Table 1]

		(a)	(b)	(c)
pH		7.00	4.80	8.38
腐食電位	噴射直前	-0.064	-0.264	-0.384
	噴射噴射中	-0.804 ~ -0.534	-0.116 ~ -0.104	-0.154 ~ -0.144

[0026]Although the test piece surface after the injection which can be (c) [(a) and] Set was not corroded, the field which receives the attack of a cavitation was corroding the test piece surface after the injection in (b) in ring shape. It turned out that corrosion resistance changes with the specimen water of a cavitation jet remarkably by this.

[0027]The conditions on which carbon steel generates a passive state by the collision of a cavitation jet became clear from the above-mentioned experimental result. That is, since corrosion resistance may improve or corrosion may promote conversely with specimen water, if a cavitation jet is injected, in order to consider this great difference, an iron pull bay diagram (Pourbaix diagram) is shown in drawing 6. Since (a) is monomorphic conditions during injection about a cavitation jet and (c) is the conditions of a passive state, (a) and (c) do not have corrosion ***** in the surface. On the other hand, since it is the conditions of a corrosion tendency, (b) carries out anticorrosion of the surface. Since the corrosion potential of the collision surface was shifted in the **** direction by the cavitation jet when dissolved ion existed, when making it the alkalinity to be used in consideration of the pull bay diagram (Pourbaix diagram) shown in drawing 6, it became clear to become the conditions of a passive state instead of a corrosion condition.

[0028]That is, it became clear that the corrosion-resistant improvement by a cavitation jet is influenced by water quality, such as pH of specimen water. When a cavitation jet performed surface treatment of material, even if it did not use ion exchange water, it has checked that corrosion could be controlled by dissolving a cheap and harmless weak alkaline salt.

[0029]Drawing 2 is a lineblock diagram showing one example of a pressure type cavitation jet device. 22 in drawing 3 is a cavitation processing container which can perform surface treatment of the workpiece A which could take the workpiece A easily and was constituted with

the lid 23 so that sealing was possible.

24 is the stowage container constituted so that it might sink in the fluid in which the cavitation processing container 22 which can store the cavitation processing container 22, and is formed more deeply than the height of the cavitation processing container 22, and was stored was stored.

In said cavitation processing container 22, the supply line 26 for supplying the high pressure liquid from the pump P is connected with the nozzle 25 which injects cavitation jet B, and the nozzle 25 concerned.

The flow control valve 27 of the high pressure liquid is formed in the middle.

In the cavitation processing container 22, the exhaust pipe way 28 which discharges the fluid in the container out of a container was established, and it has extended to the outside of the stowage container 24 to it.

The pressure control valve 29 which adjusts the pressure in the cavitation processing container 22 is allocated in the exhaust pipe way 28 concerned.

Two or more nozzles 21 can be formed in the cavitation processing container 22, and it is more desirable to form the flow control valve 27 in the pipeline 26a which branched rather than having formed high-pressure-pumping P and the nozzle 25 in the supply line 26 to connect directly.

[0030]It is put into the workpiece A by the cavitation processing container 22 easily filled with fluids, such as water in which receipts and payments and sealing are possible, or oil, and fluids, such as water or oil, are filled also between the cavitation processing container 22 concerned and the stowage container 24.

[0031]It is connected with the electronic control which is not illustrated and the above-mentioned flow control valve 27, the pressure control valve 29, the pump P, etc. are controlled to become an optimum value based on the signal from a pressure, a thermo sensor, etc. which is not arranged and illustrated in the cavitation processing container 22.

[0032]After a concrete operation (operation) of the above-mentioned example puts in the workpiece A in the cavitation processing container 22, it is sealed with the lid 23 which can be opened and closed, blows off high pressure water from the nozzle 25, generates a cavitation in the circumference of a jet, and makes the cavitation air bubbles B collide with the workpiece A. Then, the crash impulse force of the cavitation air bubbles B acts on the surface of the workpiece A, and brings about work hardening of the surface of the workpiece A, a remaining stress improvement, the improvement in fatigue strength, etc. At this time, by making into alkalinity the fluid which fills the inside of the cavitation processing container 22, and starts a cavitation jet, the workpiece A containing iron or iron shifts potential to **, and serves as a passive state. In order to make a fluid into alkalinity, an alkaline solution may be used from the beginning as the fluid concerned, sodium bicarbonate, lime, and other alkaline agents may be

added into the fluid concerned, and it may make with alkalinity. If the solution concerned is conversely made into acidity, the workpiece A containing iron or iron will carry out a potential shift to **, but it will be in the state of corrosion in that case.

[0033]In order to increase the crash impulse force of the cavitation air bubbles B, the flow of the application-of-pressure water which flows into the cavitation processing container 22 from the nozzle 25 is controlled by the flow control valve 27, The flow which flows out of the cavitation processing container 22 is controlled by the pressure control valve 29, both are adjusted and the pressure of the fluid in the cavitation processing container 22 is controlled.

[0034]Since a gaseous phase portion will be compressed with application-of-pressure water if the cavitation processing container 22 has a gaseous phase portion, fixed time is required in order to pressurize. For this reason, in this gestalt, in order to pressurize the cavitation processing container 22 for a short time, the depth of the stowage container 24 is made deep, and the predetermined pressure is given into the cavitation processing container 22 by the pressure of the fluid it was [fluid] full of the stowage container 24 concerned. The inside of the cavitation processing container 22 can be pressurized by carrying out like this in a short time, and the gaseous phase portion in the cavitation processing container 22 can be lessened as much as possible in a short time.

[0035]compared with the case where the cavitation processing container 22 is not pressurized like, remaining stress can be greatly improved with this gestalt above, fatigue strength can also be improved, and compressive residual stress can be put in until deep from the surface of a processed surface, and also corrosion resistance can be improved. Compared with the case where it does not pressurize, the effect of raising the corrosion resistance on the surface of a workpiece by short time processing can be done so.

[0036]Drawing 4 is a lineblock diagram showing the other examples of a cavitation jet device continuously. As compared with the thing of the cavitation processing container 22, the depth of the stowage container 24 of the thing of the 2nd example concerned is shallow.

It has the composition that a fluid overflows from the upper limb of the cavitation processing container 22, and the operation of processing is the same as that of the gestalt of the 1st example.

Since the thing of the 2nd example also needs to pressurize the inside of the cavitation processing container 22, the lid 23 is closed like the case where it is the 1st example, and it is made for a fluid to overflow from the crevice between the lids 23. By putting weight on the lid 23 of the cavitation processing container 22, or connecting the lid and the container with the spring of the predetermined load rate, etc., resistance can be given to opening of a lid and the inside of the cavitation processing container 22 can also be pressurized mechanically. This welding pressure can also be controlled by an electronic control etc. with a natural thing.

[0037]

[Effect of the Invention]As mentioned above, as explained in detail, this invention generates cavitation air bubbles using a ***** jet or the ultrasonic wave in liquid, While carrying out pH adjustment of the fluid concerned so that it may become alkalinity when making this **** on the workpiece surface and making cavitation air bubbles collapse, An anticorrosion approach of a workpiece and/or a reducing method of cavitation erosion which are characterized by raising the potential on the surface of a workpiece by the collapse, and making it make the workpiece surface concerned generate a passivity layer, It is the work which carried out processing treatment which raises corrosion resistance and/or cavitation erosion tightness.

[0038]Thus, when making a cavitation jet collide and performing surface treatment of material, while carrying out pH adjustment of the solution to alkalinity, make the potential on the surface of a workpiece rise it, and by ****. The collision portion of a cavitation jet can be made into a passive state, and it can raise the corrosion resistance, and it not only can control the corrosion of a material-list side easily, but can reduce cavitation erosion simultaneously.

[Translation done.]